

**Instructor** Amites Sarkar  
**Text** How to Solve It  
George Pólya

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### Course content

This course has two purposes: to help you pass the graduate qualifying exam in March, and to prepare you to teach courses in calculus and linear algebra. These are very different goals, but for both of them you will require:

- A thorough understanding of the material
- Problem solving strategies
- The ability to present a mathematical argument clearly and precisely

You will have two assignments each week. First, I will assign three questions from past qualifying exams for you to solve, and possibly present in class. Second, you will have to read either an essay (see below), or part of Pólya's book. Class time will be split between lectures (given by me), presentations (given by you), and discussions on the essays and on the book.

The phrase "problem solving strategies" requires some clarification. Perhaps you've had the following experience. Faced with a mathematical problem, you're familiar with the general theory, but, nonetheless, you don't know where to begin. This happens to even the best mathematicians. Fortunately, there's often *something* you can do to help you get unstuck. This is the subject of *How to Solve It*.

Anyone teaching mathematics should know what mathematics *as a whole* is all about, and why it's taught at all, and that's one of the reasons I'm making you read the essays below. Most can be found on the Internet using Google; I'll place the more obscure ones on a Dropbox site. I hope you enjoy reading them.

## Essays

N. Baker, Wrong answer: the case against Algebra II, *Harper's Magazine*, September 2013.

U. Dudley, What is mathematics for?, *Notices Amer. Math. Soc.* **57** (2010), 608–613.

D. Gale and L.S. Shapley, College admissions and the stability of marriage, *Amer. Math. Monthly* **69** (1962), 9–15.

W.T. Gowers, The importance of mathematics, available at <https://www.dpmms.cam.ac.uk/~wtg10/importance.pdf>.

P. Lockhart, A mathematician's lament, available at [http://www.maa.org/external\\_archive/devlin/LockhartsLament.pdf](http://www.maa.org/external_archive/devlin/LockhartsLament.pdf)

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## Office hours

My office hours are 3–3:50pm on Mondays, Tuesdays, Wednesdays and Fridays, in 216 Bond Hall. My phone number is 650 7569 and my e-mail is amites.sarkar@wwu.edu